Zephyr Water Utility District
Preliminary Engineering Report (PER)

HDR Engineering, Inc. and
Douglas County Public Works

March 09, 2017

Overview

1. Why are we here?
2. What is a Preliminary Engineering Report (PER)?
3. Need for Capital Improvements
4. Project Alternatives
5. Prioritized Recommendations
6. Short-term, Mid-term and Long-term Implementation Recommendations
7. Questions & Break Out Stations

Why are we here?

- October 16, 2014
  - Adopted Resolution No. 2014R-081 establishing water rates for the Zephyr Water Utility District Water System
  - Allow time to complete Preliminary Engineering Reports and develop a financing plan to implement future capital improvements
- January 15, 2015 – County awarded a contract with HDR Engineering to prepare Preliminary Engineering Reports
  - Zephyr Water Utility District, March 9, 2017
  - Cave Rock and Skyland, March 21, 2017
  - Uppaway, April 4, 2017
- Present information on the PER findings and recommendations

What is a Preliminary Engineering Report (PER)?

- Outline Follows USDA Bulletin 1780-2
  - Identify water system deficiencies
  - Develop and compare project alternatives to address those deficiencies
  - Identify and evaluate environmental impacts of the project alternatives
  - Prioritize recommended projects
  - Provide preliminary costs

PER - Need for Capital Improvements

- Deficiencies 1-8 - Fire Flow, Pressure, Velocity, Line Size Criteria and Line Leaks
- Deficiency 9 - Storage Tank Coating Condition
- Deficiency 10 – Supply Redundancy
- Deficiency 11 – Water Conservation
- Deficiency 12 – Lake Pump Station Intake Prime
- Deficiency 13 – Marla Bay Pump Station Piping Corrosion
- Deficiency 14 – Water Treatment Plant Electrical
- Deficiency 15 – Water Treatment Plant Controls/SCADA
- Deficiency 16 – Unstable Hypochlorite Residual

Deficiencies 1 – 8 Fire Flow, Pressure, Velocity …

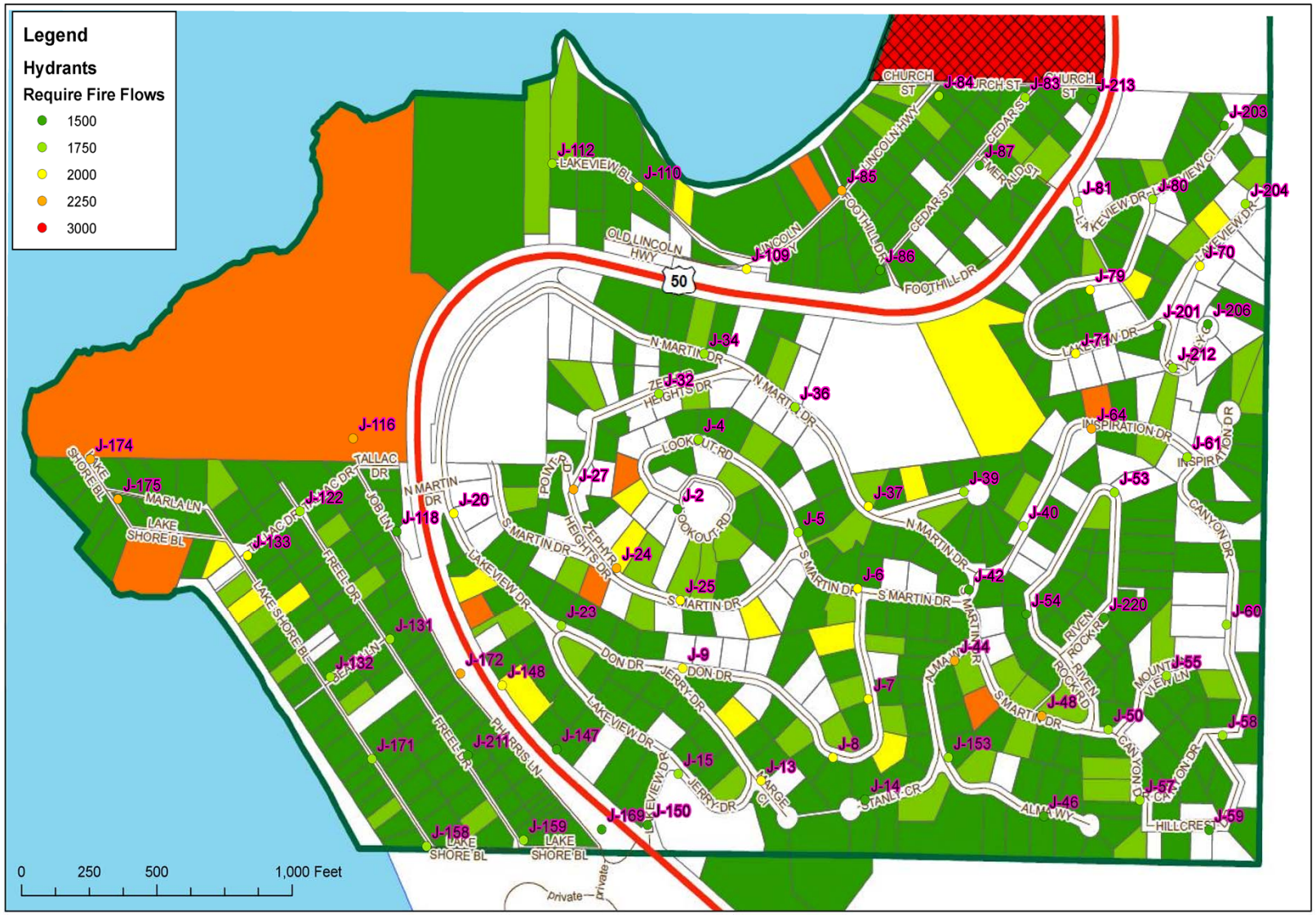
- NAC 445A.6673 Existing systems: Evaluation, justification and design of proposed water project
  - 2. Designed on the basis of historical data or other representative data that complies with accepted engineering judgment and practice, in such a manner that the proposed water project will ***enable the public water system to meet*** average day demand, maximum day demand, peak hour demand and requirements for ***fire flow and fire demand.***

Fire Flow Requirements

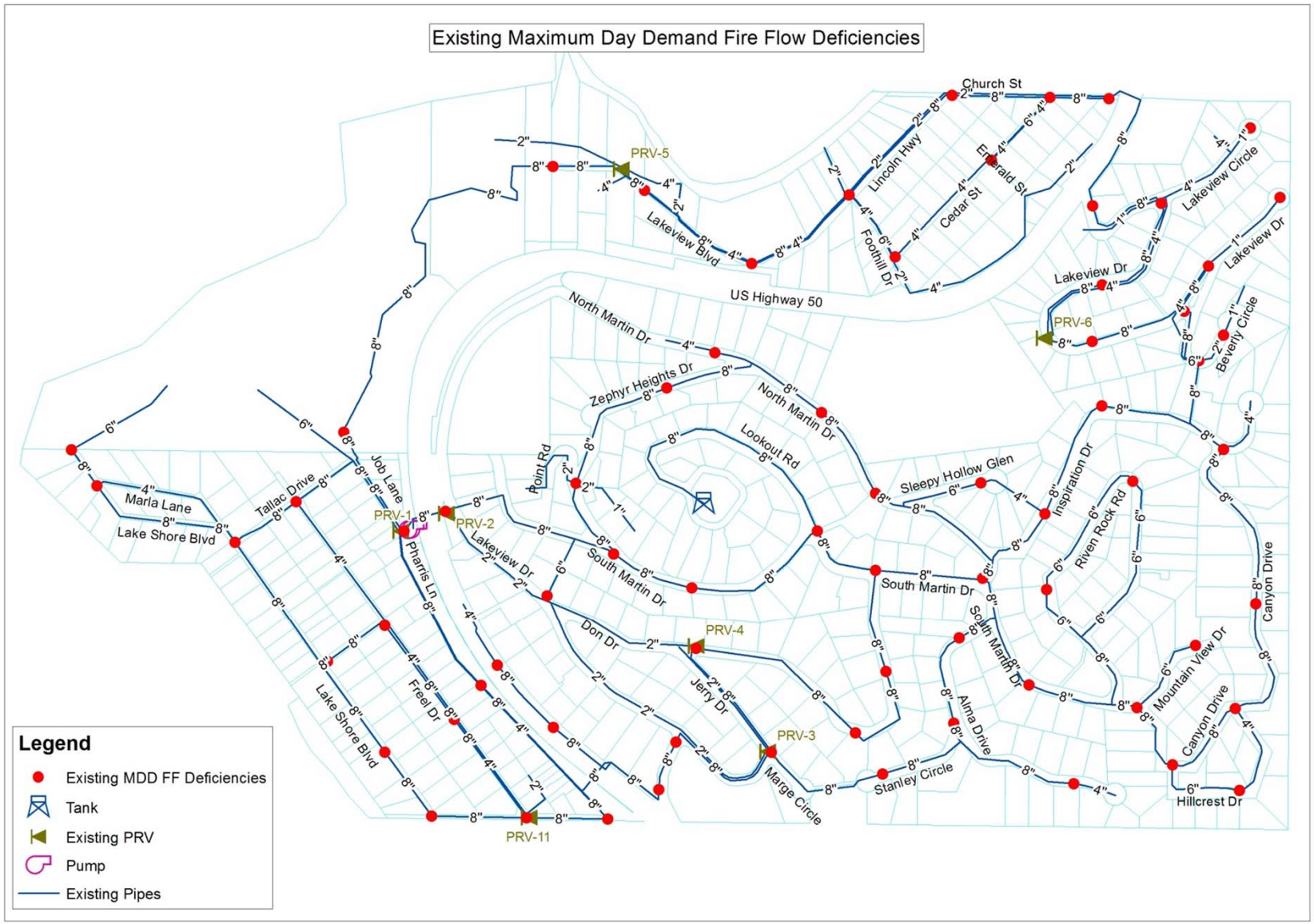
- International Fire Code (IFC) Table B105.1
  - Building Size and Construction
  - Fire Flow Calculation Area

0 -3,600 sf	3,601 – 4,800 sf	4,801 – 6,200 sf	6,201 – 7,700 sf	11,301 – 13,400 sf
1,500 gpm,	1,750 gpm,	2,000 gpm,	2,250 gpm,	3,000 gpm,
2 hours	2 hours	2 hours	2 hours	3 hours

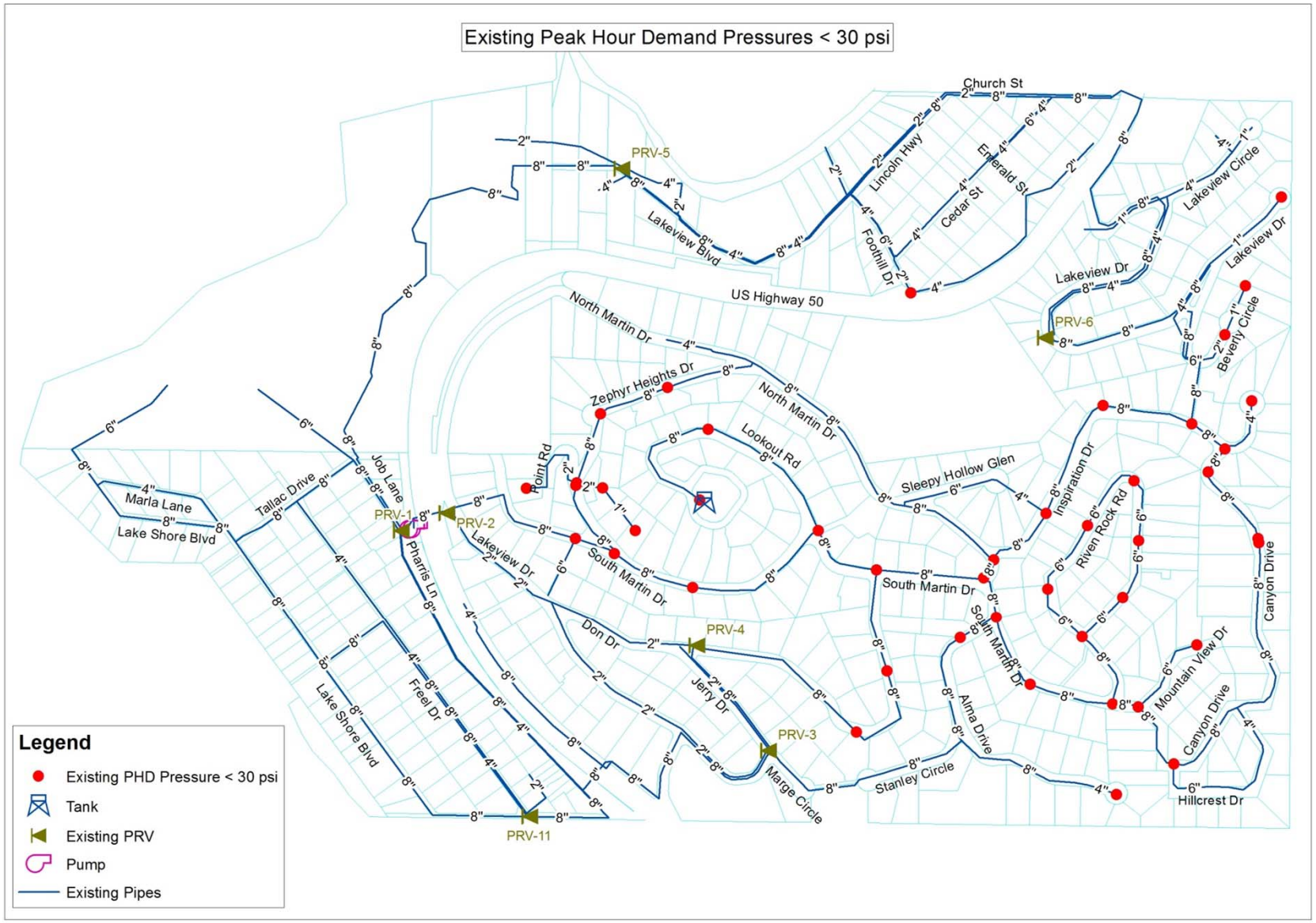
Fire Flow Requirements by Parcel



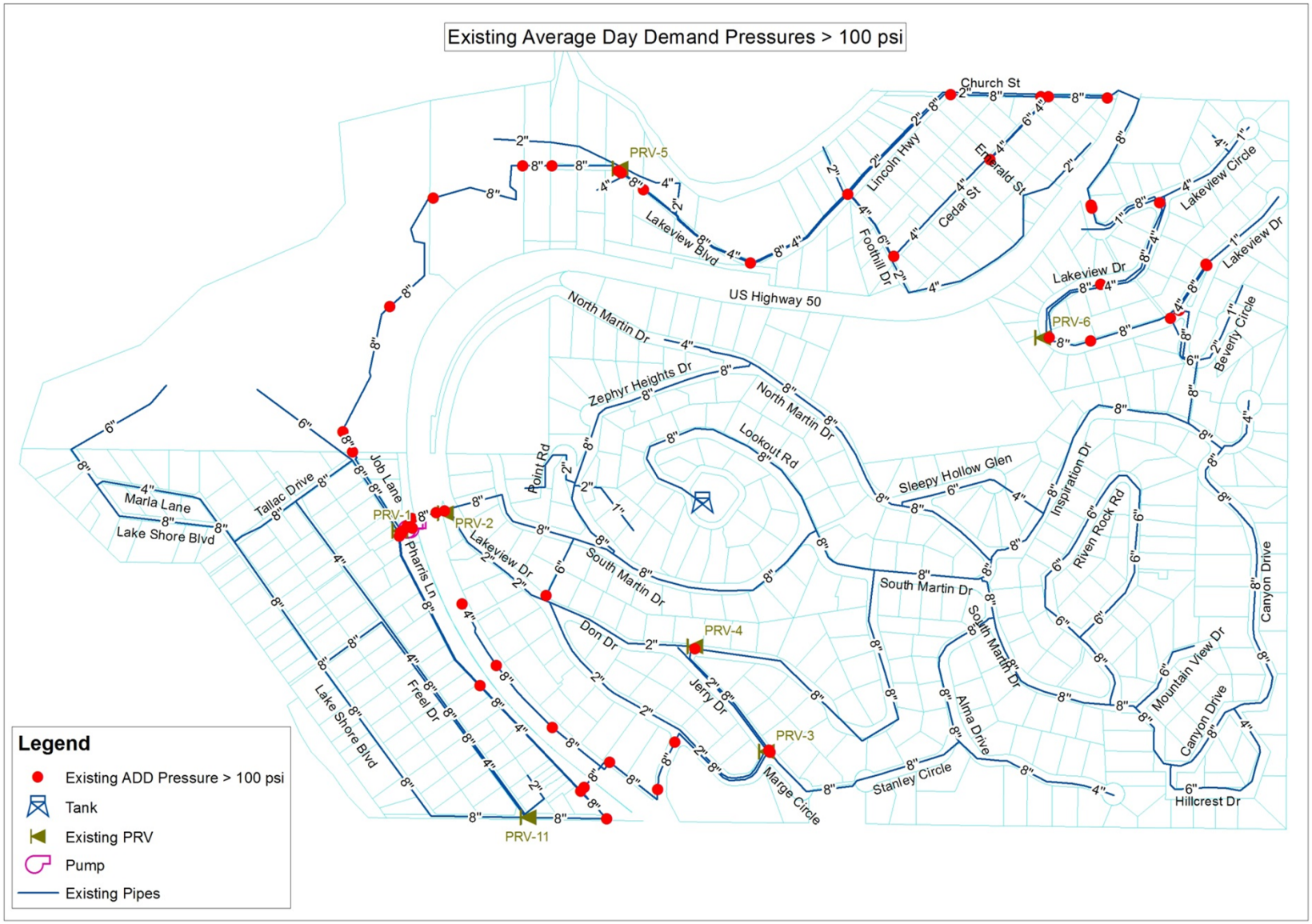
Fire Flow Deficiencies



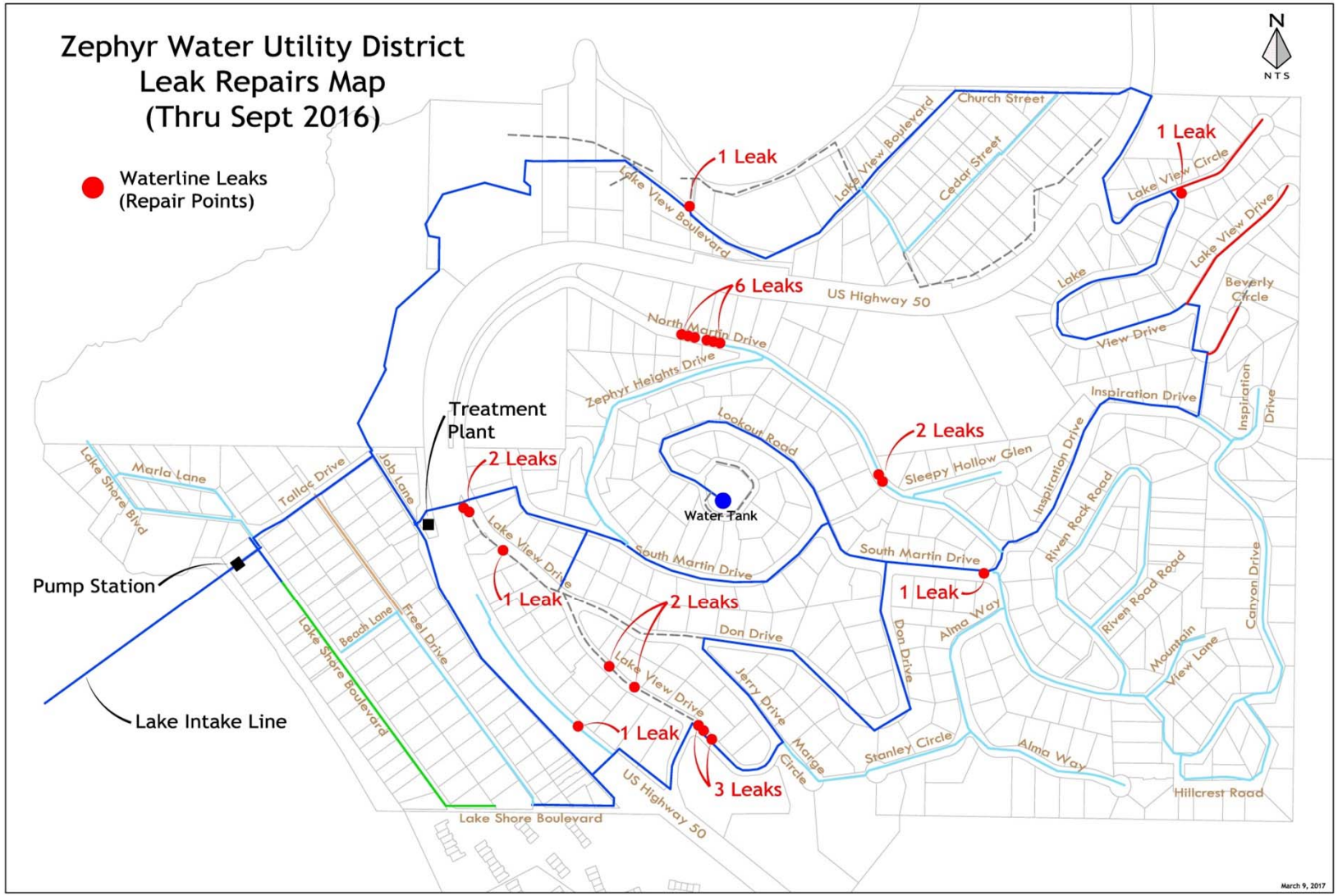
Peak Hour Pressure Deficiencies



Average Day Demand Pressure Deficiencies



Leak Repairs (through Sept. 2016)



Deficiency 9 – Storage Tank Coating

Inlet/Outlet

Ceiling

Deficiency 10 – Water Supply Redundancy

- Single Source of Water
- NAC 445A.6678 Requires a Backup Source

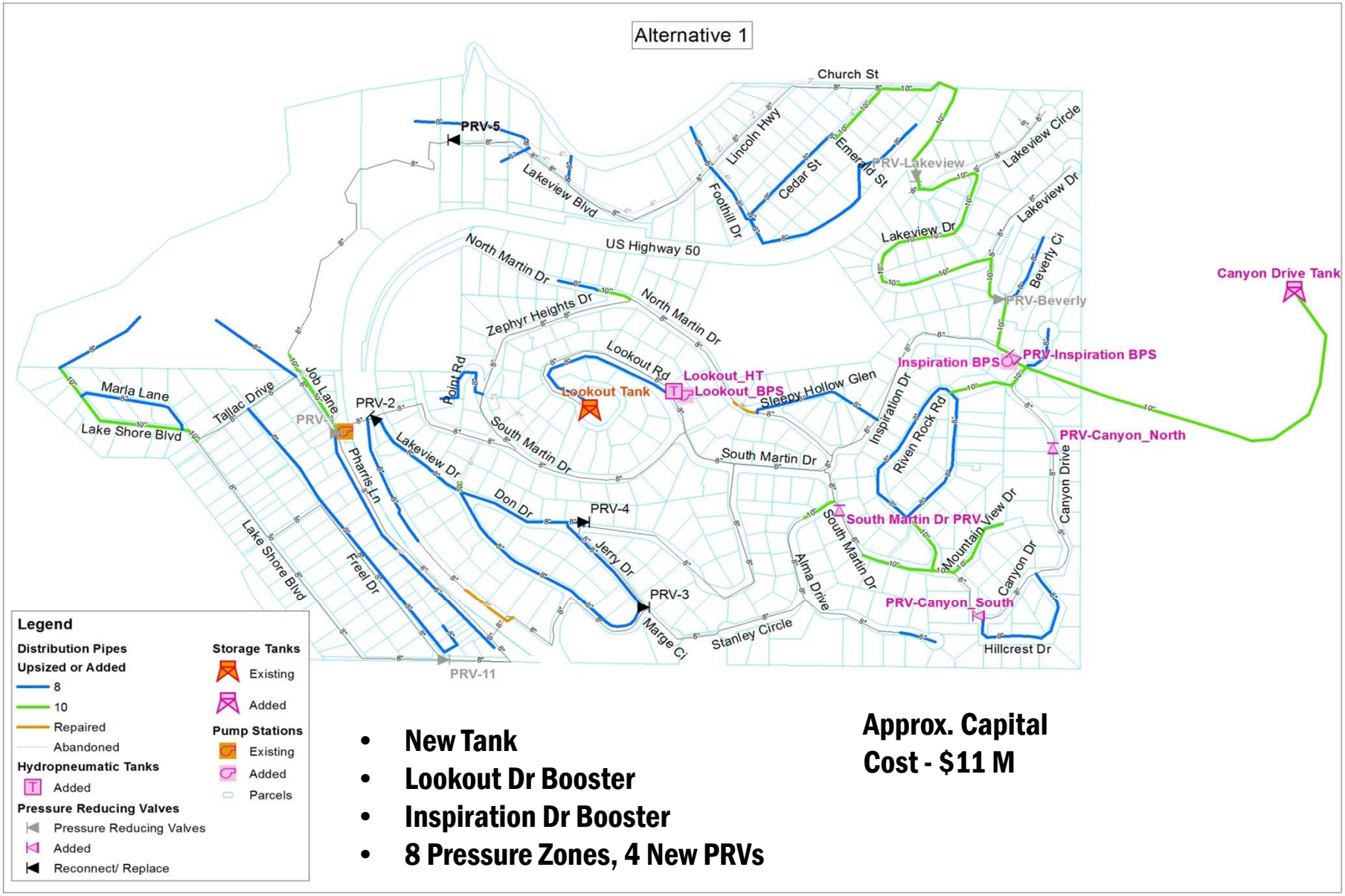
Deficiency 11 – Water Conservation

- Just 8% of services are Metered
- NRS 540.131 Requires a Water Conservation Plan
  - "Metering of all water services is an essential element of a water conservation plan."

Deficiencies 12-16 Lake Pump Station and WTP

- Lake Pump Station
  - Loss of Intake Prime
  - Reduced Pump Flow
  - Failing Coatings
- WTP
  - Aging Electrical and SCADA/Controls
  - Unstable Hypochlorite Residual

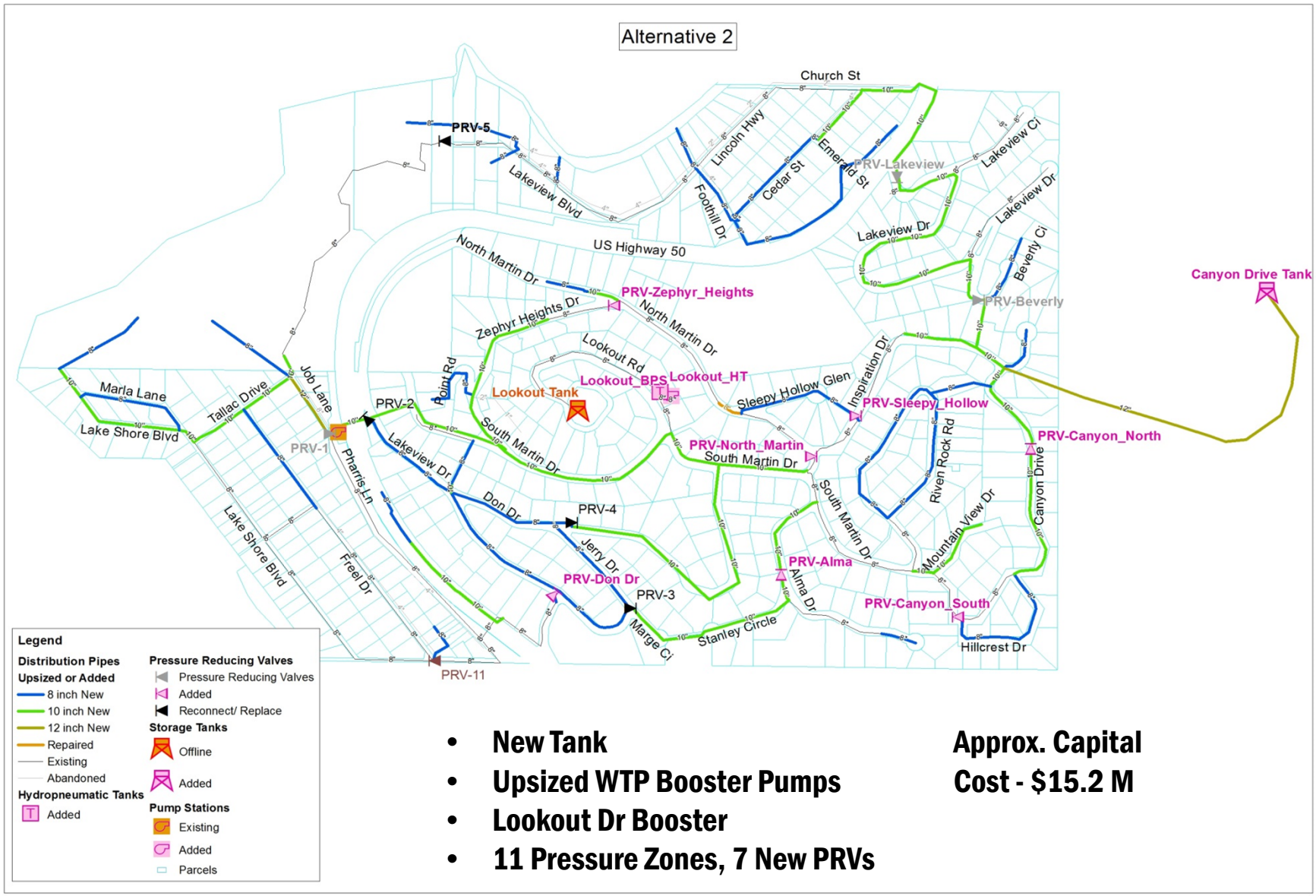
Deficiencies 1-8 Alternative 1



- **New Tank**
- **Lookout Dr Booster**
- **Inspiration Dr Booster**
- **8 Pressure Zones, 4 New PRVs**

Approx. Capital Cost - $11 M

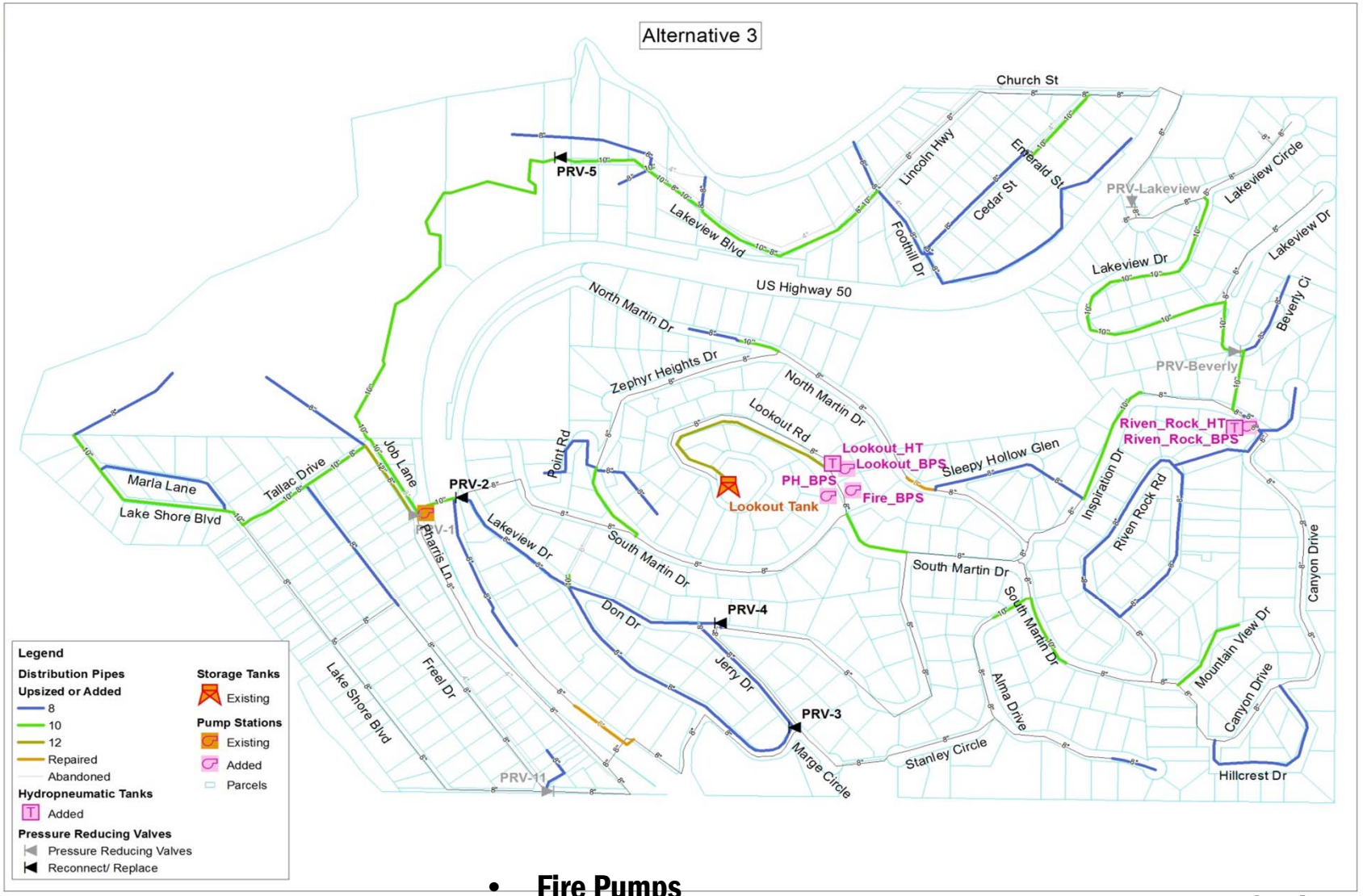
Deficiencies 1-8 Alternative 2



- **New Tank**
- **Upsized WTP Booster Pumps**
- **Lookout Dr Booster**
- **11 Pressure Zones, 7 New PRVs**

Approx. Capital Cost - $15.2 M

Deficiencies 1-8 Alternative 3



- **Fire Pumps**
- **Lookout & Riven Rock Dr Booster Pumps**
- **7 Pressure Zones, No New PRVs**

Approx. Capital Cost - $10.7 M

Alternative Ranking Criteria

- Implementation (20%)
  - Is the alternative feasible to implement?
  - Is the alternative constructible?
- Reliability (25%)
  - Will the alternative provide reliable results?
- Operation /Maintenance (40%)
  - Does the alternative require a large operator time commitment?
  - Does it require ongoing contract maintenance?
- Environmental / Permitting (15%)
  - Can TRPA thresholds be met?
  - Are there short-term and long-term effects on the environment?
  - Will the alternative be difficult to permit?

Alternative Ranking Summary

Deficiency	Alternative	Score	Rank
1 – 8 Fire Flow, Pressure…	1 – New Tank, Inspiration & Lookout Dr. Boosters, 7 Pressure Zones	2.4	3
1 – 8 Fire Flow, Pressure…	2 – New Tank, High Pressure WTP Booster, Lookout Dr. Booster, 11 Pressure Zones	2.3	2
1 – 8 Fire Flow, Pressure…	3 – Riven Rock Dr. Booster, Lookout Dr. Fire & Booster, 6 Pressure Zones	2.0	1
12 – Loss of Intake Prime	1 – Self Priming Pumps	1.0	1
12 – Loss of Intake Prime	2 – Submersible Pumps	2.9	2
16 – Unstable Hypochlorite Residual	1 – Move Injection Point	0.9	1
16 – Unstable Hypochlorite Residual	2 – Mechanical Mixer	1.4	2

Project Priorities

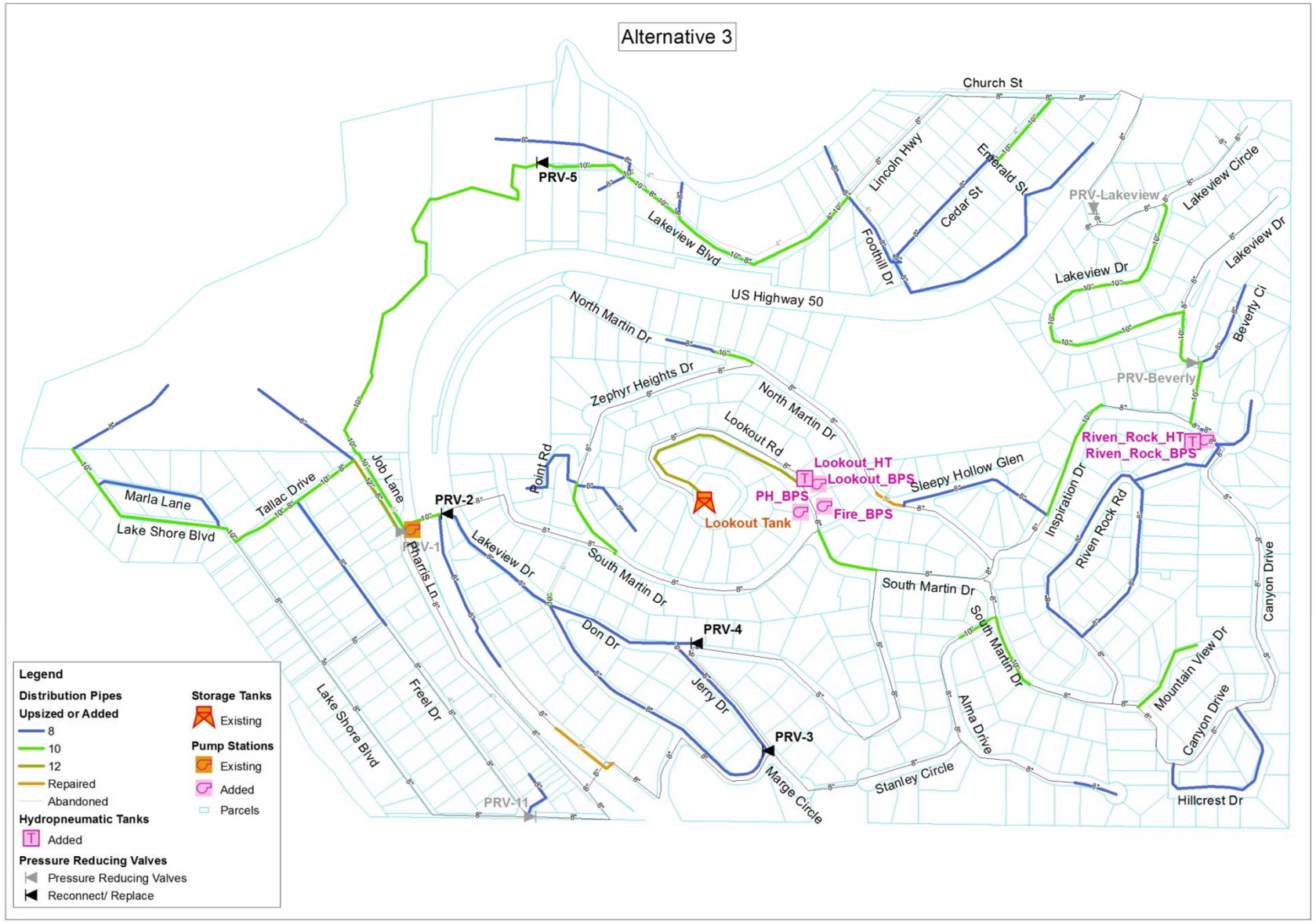
- Priority 1
  - Address public health and safety risks.
- Priority 2
  - Address temporary disruption of water service or compliance, but generally minimal public health and safety impacts.
- Priority 3
  - Increase operational efficiencies, but are not likely to cause loss or disruption of service or compliance.
- Priority 4 Projects
  - Provide further gains in efficiency from Priority 3, but are not needed for operations.
  - Represent “wants” more than “needs”.

Project Priority Summary and Costs

Table 7-1. Project Priority Summary and Costs

Deficiency No.	Description	Priority	Recommended Alternative	Capital Cost (x$1,000)
1-4	Fire Flow, & Pressure Criteria	1	3 - Fire & Booster Pumps	$1,643
8	Line Leaks	2	Replace Lines	$195
14	WTP Electrical	2	Surge Protection & UPS	$66
15	WTP SCADA & Controls	2	UPS & SCADA PAK & SCADA LOG	$124
16	Unstable Hypochlorite Residual	2	1 - Dose Pace & Move Injection Point	$28
12	Lake Intake Prime	3	1 - Self-Priming Pumps	$143
9	Storage Tank Coating	3	Recoat Tank	$358
11	Water Conservation	3	Water Meters & Dedicated Services	$1,563
10	Water Supply Redundancy	4	Cave Rock Intertie & Booster Station	$1,723
13	MBPS Piping & Building Coatings	4	Recoat Piping & Building	$29
5, 6	Max Velocity Criteria	4	Upsize Lines	$8,239
			Total	$14,111

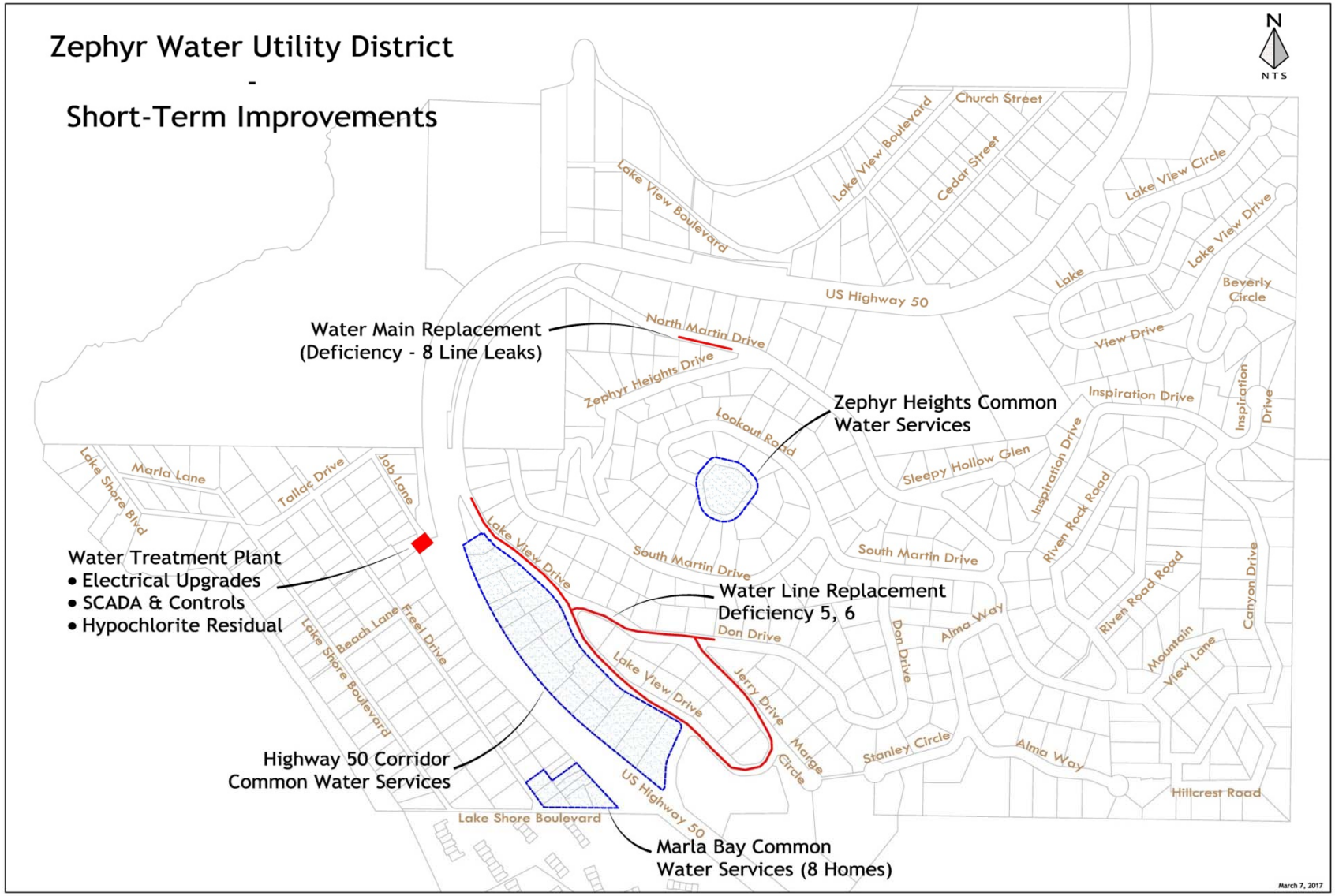
Line Replacements & Fire/Booster Pumps



Short-term Implementation Recommendations

				Estimated Monthly Rate per Customer	
Deficiency No.	Recommended Alternative	Priority	Capital Cost	SRF Loan (20 yrs)	USDA Loan (40 yrs)
8	Line Leaks	2	$ 195,000	$ 2.07	$ 1.55
14	WTP Electrical	2	$ 66,000	$ 0.70	$ 0.53
15	WTP SCADA & Controls	2	$ 124,000	$ 1.32	$ 0.99
16	Unstable Hypochlorite Residual	2	$ 28,000	$ 0.30	$ 0.22
11	Water Conservation - Dedicated Water Services	3	$ 366,563	$ 3.89	$ 2.92
13	MBPS Piping & Building Coatings	4	$ 29,000	$ 0.31	$ 0.23
5, 6	Max Velocity Criteria - Lake View Drive, Jerry and Don Water Lines	4	$ 1,105,000	$ 11.72	$ 8.81
Total			$ 1,913,563	$ 20.30	$ 15.26
			Available Monthly Debt	$ (15.73)	$ (15.73)
			Annual Debt to Finance	$ 4.57	$ (0.47)
Notes:					
1. Deficiency 13 - MBPS Piping & Building Coatings at a cost of $29,000 to be paid for out of the operating budget					

Short-term Implementation Recommendations



Medium-term Implementation Recommendations

				Estimated Monthly Rate per Customer	
Deficiency No.	Recommended Alternative	Priority	Capital Cost	SRF Loan (20 yrs)	USDA Loan (40 yrs)
12	Lake Intake Prime	3	$ 143,000	$ 1.52	$ 1.14
9	Storage Tank Coating	3	$ 358,000	$ 3.80	$ 2.85
Total			$ 501,000	$ 5.31	$ 3.99

Long-term Implementation Recommendations

				Monthly Rate per Customer	
Deficiency No.	Recommended Alternative	Priority	Capital Cost	SRF Loan	USDA Loan
1-4	Fire Flow, & Pressure Criteria	1	$ 1,643,000	$ 17.43	$ 13.10
11	Water Conservation - Meters	3	$ 1,196,437	$ 12.69	$ 9.54
10	Water Supply Redundancy	4	$ 1,723,000	$ 18.28	$ 13.74
5, 6	Max Velocity Criteria (Not including Lake View Drive, Don and Jerry)	4	$ 7,134,000	$ 75.68	$ 56.89
Total			$ 11,696,437	$ 124.08	$ 93.27

Questions & Break Out Stations

- Distribution System & WTP
- Fire Flows
- Financial

Public Comments

- Written comments can be submitted to:

  publicworks@douglasnv.us

- ZWUD PER Available on Public Works website at:

  http://www.douglascountynv.gov/DocumentCenter/View/5931

- Ron Roman
  - 775-782-6239
  - rroman@douglasnv.us